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The Coal Situation

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NORTH AMERICAN ELECTRIC POWER SUPPLY & DEMAND 1984-1983

The North American Electric Reliability Council (NERC) was formed by the U.S. and Canadian electric utility industry in 1968 to promote the reliability and adequacy of bulk power supply in the electric utility systems of North America. NERC consists of nine regional reliability councils and one affiliate encompassing virtually all of the power systems in the United States and Canada. The regional identification and geographic boundaries of the nine regional councils are shown in Figure 1.

FIGURE 1
NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

ECAR
East Central Area Reliability Coordination Agreement

ERCOT
Electric Reliability Council of Texas

MAAC
Mid-Atlantic Area Council

MAIN
Mid-America Interpool Network

MAPP
Mid-continent Area Power Pool

NPCC
Northeast Power Coordinating Council

SERC
Southeastern Electric Reliability Council

SPP
Southwest Power Pool

WSCC
Western Systems Coordinating Council

AFFILIATE

ASCC
Alaska Systems Coordinating Council

One of the major activities of NERC is the annual compilation of utility forecasts relating to electric power supply and demand in North America. The aggregations of the projections developed and supplied by the individual utility members of each regional council are summarized and published in an annual report entitled *Electric Supply and Demand*. NERC recently released its latest edition of this report which covers the projections of North American power supply and demand for the ten-year period 1984-1993. The purpose of this issue of *The Coal Situation* is to review these latest projections as to their meaning to the coal producers of the United States and Canada.

NERC Projections of Annual Electrical Energy Demand

On an aggregate basis, U.S. utility members of NERC are forecasting net annual electrical energy demand growing at an average compound rate of 2.7 percent per year over the period 1984-1993 (1984 as base year)*. As shown in Table 1, forecasted regional growth in net energy for load, ranges from a low of 1.8 percent per year in MAAC (New Jersey, Delaware, and portions of

*NERC calculates average annual growth over the forecast period by taking the ninth root of the difference between the energy values for the first and tenth projected year.

TABLE 1
NERC PROJECTIONS OF NET ANNUAL ELECTRICAL ENERGY REQUIREMENTS FOR U.S. AND CANADIAN ELECTRIC UTILITIES
(Terawatt-hours)

NERC Region	1983 Actual	Projection 1984	Projection 1993	Average Annual Growth – % 1984-1993**
ECAR	364.5	370.8	459.9	2.4
ERCOT	173.4	185.0	262.5	4.0
MAAC	180.0	180.5	211.5	1.8
MAIN	166.0	164.9	202.8	2.3
MAPP–U.S.	102.5	104.8	135.1	2.9
NPCC–U.S.	210.8	211.7	250.6	1.9
SERC	490.9	501.7	655.9	3.0
SPP	217.7	222.5	290.6	3.0
WSCC–U.S.	435.9	448.2	570.9	2.7
NERC's–U.S.*	2,341.6	2,390.1	3,039.9	2.7
MAPP–Canada	21.1	24.4	31.8	3.0
NPCC–Canada	214.9	221.9	286.7	2.9
WSCC–Canada	63.3	68.2	95.3	3.8
NERC–Canada*	302.3*	314.5	413.8	3.1

*Totals may not add due to independent rounding.
**Calculated by NERC as the ninth root of the difference between the energy values for the first and tenth projected years.

Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report.

Pennsylvania and Maryland) to 4.0 percent per year for ERCOT (Texas). In general, the regional projections show stronger growth in electricity requirements in the South and Southwestern portions of the United States. This is consistent with the "Sunbelt" shift in regional economic and population growth patterns in the U.S.

As for Canada, Canadian utilities are forecasting a growth rate for net annual electric energy demand of 3.1 percent per year over the period 1984-1993. Regionally, as shown in Table 1, stronger growth in load requirements are expected in WSCC-Canada (Western Canada).

For both the United States and Canada, NERC's latest ten-year projection for load requirements continue to exhibit decreases relative to previous forecasts. Last year U.S. electric utilities were projecting a ten-year (1983-92) growth in net electricity requirements for load of 3.2 percent per year, while Canadian utilities were forecasting a ten-year growth rate of 3.7 percent per year (1983-92). The reduction in the U.S. forecasts results in a two-year slippage in electric energy requirements, with this year's projection of 3,039.9 terawatt-hours (TWH) in 1993 equal to last year's projection for 1991 (3,039.2 TWH). The decline in the Canadian growth rate projections results in a more than 1½-year slippage in Canadian energy requirements by the tenth year.

The latest reduction in anticipated load requirements is one in a long string of downward revisions which have occurred since NERC began utility projections. This trend is illustrated in Figure 2, which shows NERC's plotting of actual requirements versus the ten-year projections for the U.S. utilities' peak electricity demand requirements which appeared in the last ten editions of *Electric Power Supply & Demand*. The significant downward adjustments in the forecasts reflect lower projections of the rate of growth for economic activity, changing patterns of consumer demand, and energy conservation.

NERC Projected Capacity Additions By Fuel Type

Even though exhibiting lower rates of growth than previously expected, the latest NERC projections show U.S. electricity demand in 1993 which is 29.8 percent greater than actual requirements in 1983. For Canadian utilities, net annual requirements for load is projected to increase by 36.9 percent by 1993 versus the 302.3 TWH required in 1983.

To meet the growth in load requirements and to replace 15.1 gigawatts (GW) of planned unit retirements, U.S. electric utilities in their submissions to NERC are indicating plans to add 130.8 GW of generating capacity over the period 1984-1993. As shown in Table 2, U.S. utilities are currently anticipating the addition of 56.3 GW (107 units) of coal-fired capacity, and 55.1 GW (50 units) of nuclear-based capacity over the decade. Together, these two energy sources represent 85.1 percent of total U.S. utility planned capacity additions between 1984-1993 with the remaining additions represented by oil and gas, hydro, and others (wood, solar, blast furnace gas, etc.). In contrast, last year's projections showed U.S. utilities planning to add 129 new coal-fired units and 60 new nuclear units between 1983 and 1992.

It is interesting to note that of the 15.1 GW of planned retirements over the forecast period, oil and gas-fired units represent 85.6 percent or 12.9 GW. Thus, U.S. electric utilities are planning for a net reduction of 9.9 GW of oil and gas-fired capacity between now and 1993.

TABLE 2

NERC PLANNED GENERATING UNIT ADDITIONS 1984-1993

United States	Number of Units	Total Summer Capability (Gigawatts)	Percent of Total Capability	Average Unit Size (Megawatts)
Coal	107	56.3	43.0	526
Nuclear	50	55.1	42.1	1,101
Oil & Gas	49	3.0	2.3	62
Hydro	199	4.0	3.1	20
Other	163	12.4	9.5	76
Total	568	130.8	100.0	–
Canada				
Coal	10	3.4	19.3	345
Nuclear	11	8.2	45.8	745
Oil & Gas	0	0.0	0.0	–
Hydro	28	5.8	32.0	206
Other	6	0.5	2.8	84
Total	55	17.9	100.0	–

Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report.

As for the Canadian utilities, a total of 17.9 GW of new generating capabilities are planned to be added by 1993 (planned Canadian retirements total 0.214 GW between 1984-1993). Nuclear at 8.2 GW or 45.8 percent of the total is the principal form of new generation in Canada followed by hydroelectric facilities at 5.8 GW or 32 percent of the total. In third place is coal, with Canadian utilities anticipating the addition of 3.4 GW of capacity by 1993.

Based on the planned additions outlined above and current unit capabilities, U.S. and Canadian utilities are projecting the share of their net generation by fuel type which is shown in Table 3. In the U.S., coal is projected to essentially maintain its share of electricity production through the forecast period. On a proportional share, however, the dramatic increase in nuclear capacity results in an almost doubling in its percentage contribution to power generation by 1993.

In Canada, the heavy predomination of nuclear and hydroelectric capacity additions results in the sharp decline in the share of power generated by coal, falling from 21.9 percent in 1983 to 13.8 percent by 1993.

TABLE 3

NERC PROJECTED SHARE OF ELECTRIC GENERATION BY ENERGY TYPE

(Percent)

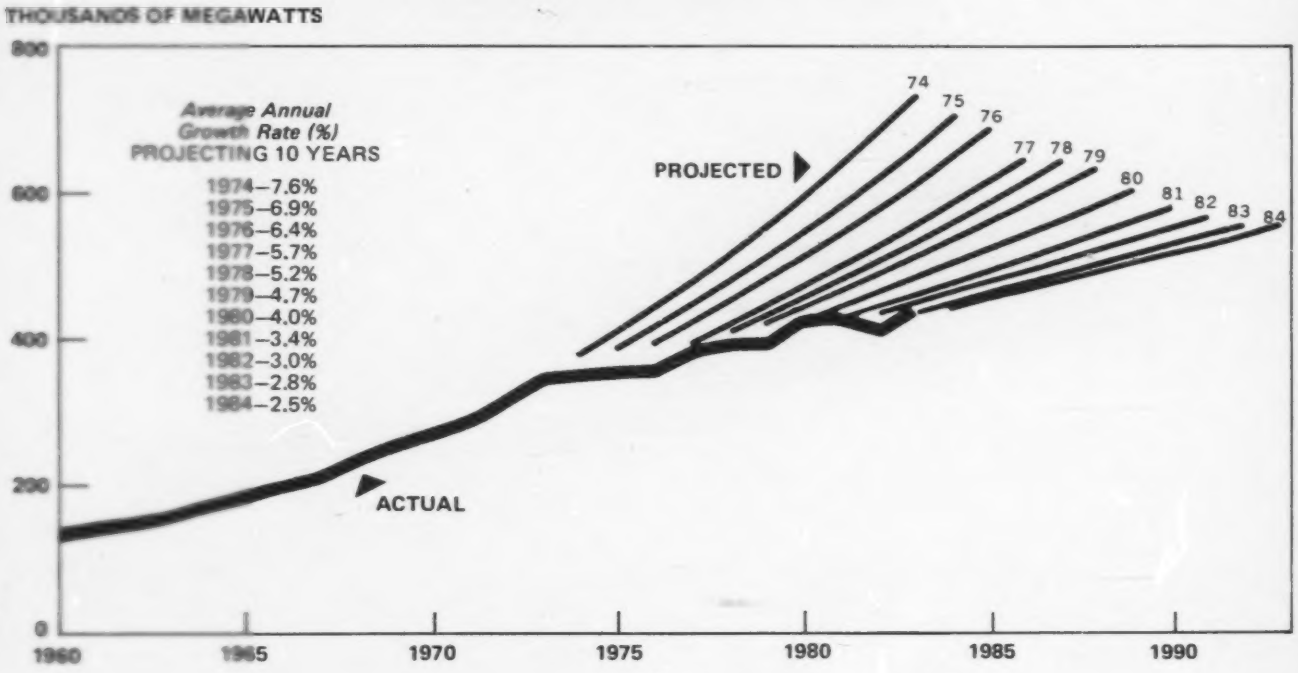
	U.S.		CANADA	
	1983 Actual	1993 Forecast	1983 Actual	1993 Forecast
Coal	54.8	54.6	21.9	13.8
Nuclear	12.9	23.6	15.0	26.1
Hydro	14.2	8.3	61.5	58.0
Oil	5.9	4.3	0.6	0.5
Gas	11.6	7.5	0.7	1.3
Other*	0.6	1.7	0.2	0.3
Total	100.0	100.0	100.0	100.0

*Includes net pumped storage requirements

Note:				
Net Annual Energy Requirements (TWH)	2,341.6	3,029.8	302.3	413.8
Less Net Imports (TWH)	54.5	121.7	–6.2	–11.7
Total Generation (TWH)	2,287.1	2,918.1	308.5	425.5

Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report.

FIGURE 2
COMPARISON OF NERC's ANNUAL TEN-YEAR FORECASTS
OF U.S. SUMMER PEAK DEMAND PROJECTIONS



Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report

NERC Projected Coal Requirements

The NERC projections of the quantity of coal to be consumed in generating electricity between 1984 and 1993 are shown in Table 4. In 1993, U.S. utilities are anticipating the use of 825.6 million net tons of coal. This represents an increase of 204.5 million net tons over the actual coal consumption in 1983, an average compound rate of growth over the ten years of 2.9 percent per year (1983-1993). This quantity of coal usage, however, is almost 5 million tons lower than last year's forecasted consumption for 1991.

While total utility coal consumption is projected to increase in the U.S., the regional projections provided by NERC indicates that the growth in coal usage will be concentrated in the higher electricity demand growth, less nuclear dependent areas of the nation. As shown in the table, coal consumption is expected to decline through the middle of the projection period for the MAAC and MAIN regions before stabilizing or recovering slightly. This decline reflects the heavy dependence upon coal for power generation in these regions which in combination of lower anticipated growth in demand and the completion of nuclear power plant construction which was begun during periods of higher demand growth forecasts, forces the decreased use of coal for power generation. Once nuclear additions are completed, coal consumption at existing coal-fired power plants begins to increase.

A somewhat similar situation as for MAAC and MAIN exists in Canada with Canadian utility coal requirements projected to decline through the middle of the forecast period before recovering. Like the regional decline in U.S. coal consumption, the fall in Canadian coal usage occurs in the NPCC-Canada region (Ontario) where lower rates of growth in demand coupled with the planned addition of a significant quantity of nuclear capacity forces down the use of coal throughout the ten-year period. The reduction in coal usage for power generation in Ontario, however, is offset by the projected 79.3 percent increase in the use of coal by Western Canadian utilities. Since Ontario, more specifically Ontario Hydro, obtains almost 87 percent of its coal requirements from the U.S., the anticipated decline in this region's use of coal does not bode well for U.S. exporters.

In 1983, NPCC-Canada (Ontario), consumed 11.57 million net tons of U.S. coal. By 1993, the region is projecting to consume only 3.3 million net tons of U.S. coal. This figure for 1993 assumes the complete elimination of the 1.55 million short tons of Canadian coal the province used for power generation up through 1992. If Ontario were to maintain its usage of Canadian coals, the consumption of U.S. coal in 1993 would be as low as 1.75 million net tons.

As for the sources of coal supply being projected by the U.S. NERC utilities, the majority of their anticipated requirements are forecast to come from mines located west of the Mississippi River. As shown in Table 5, NERC has identified the geographical mining location for 180.1 million tons of the total 204.6 million tons of additional coal requirements to be consumed by U.S. electric utilities in 1993. Of the total for which mining locations have

TABLE 4

NERC PROJECTED NORTH AMERICAN UTILITY COAL CONSUMPTION – 1984-1993

(1000 Net Tons)

REGION	Actual 1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
ECAR	161,661	172,226	169,232	170,877	172,148	175,088	179,130	179,601	181,461	184,328	186,124
ERCOT	52,247	51,396	51,415	55,433	59,788	63,143	73,629	78,366	86,841	93,378	102,732
MAAC	38,537	36,673	35,072	34,312	34,578	34,538	35,303	33,208	34,178	35,025	35,332
MAIN	58,694	55,729	53,312	52,570	50,781	52,722	54,343	54,944	55,770	56,902	57,783
MAPP–U.S.	48,744	45,592	49,088	51,186	53,308	56,062	57,357	58,928	58,539	63,022	65,386
NPCC–U.S.	13,151	14,023	15,112	16,279	19,116	22,056	23,156	23,161	23,529	23,713	23,670
SERC	116,164	125,266	136,017	137,934	137,450	140,034	137,900	142,306	145,549	149,405	152,417
SPP	62,450	65,595	69,564	73,869	76,527	78,725	79,062	81,876	85,290	91,264	97,072
WSCC–U.S.	69,409	79,817	85,247	86,700	91,752	95,563	97,542	97,922	100,535	103,617	105,098
NERC–U.S.	621,057	646,317	664,059	679,160	695,448	717,931	737,422	750,312	771,692	800,654	825,614
MAPP–CANADA	7,406	7,240	7,326	6,843	7,310	7,560	7,814	8,077	8,340	8,630	9,012
NPCC–CANADA	13,899	10,988	8,542	7,369	6,504	5,428	4,417	5,148	5,228	4,374	3,647
WSCC–CANADA	15,264	17,354	18,468	19,805	20,706	22,347	23,776	24,349	25,199	26,277	27,375
NERC–CANADA	36,569	35,582	34,336	34,017	34,520	35,335	36,007	37,574	38,767	39,281	40,034

Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report

been identified, 72.9 percent is projected to be mined west of the Mississippi River. The increased use of lignite represents 32.4 percent of the identifiable sources of coal supply, the majority which (70.7 percent) is the projected increase in the use of Texas lignites to be consumed by the utilities in NERC's ERCOT region.

TABLE 5

NERC PROJECTED SOURCES OF U.S. UTILITY COAL SUPPLIES

Coal Production Regions	Net Increase 1983-1993 (Million Tons)	Percent of Total Identified
East of Mississippi River	48.7	27.1
West of Mississippi River		
– Lignites	58.4	32.4
– Others	73.0	40.5
Total Identified Sources	180.1	100.0
Unidentified Sources	24.5	–
Total	204.6	

Source: NERC, *Electric Power Supply & Demand 1984-1993*, 1984 Annual Data Summary Report.

Summary and Conclusions

In summary, the latest NERC projections of North American electric power supply and demand indicates the continuation of the trend toward lower growth rates for electricity demand and production. As a result of the reduction in the growth of electric demand, the projected use of coal for power generation has decresed relative to previous projections. On a regional basis, NERC projections of utility coal requirements should be of major concern for those U.S. coal suppliers exporting to Canada and/or supplying coal within the MAAC (Pennsylvania, New Jersey, Delaware, and Maryland) and MAIN (Illinois, Wisconsin) regions. On a more positive note, if NERC projections hold true, Western U.S. and Canadian coal producers can anticipate the continued growth in utility coal demands, albeit at rates lower than the utilities have previously projected.

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Author's Note:

The reader is reminded that the projections provided in this analysis are those released by the North American Electric Reliability Council and should not be construed as the opinion of The Chase Manhattan Bank. A copy of NERC's report *Electric Power Supply & Demand 1984-1993*, 1984 Edition can be obtained from: North American Electric Reliability Council, Research Park, Terhune Road, Princeton, NJ 08540.